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DETERGENT COMPOSITION

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(57) Claim

1. A detergent composition in the form of an aqueous liquid of viscosity in the range from 10,000 to 1,000 mPas at 10 sec<sup>-1</sup> shear rate, comprising:

A - foaming detergent active which is a mixture of:

A1 - at least 5% by weight of the composition of a non-soap anionic detergent which is selected from alkyl ether sulphates, acyl isethionates, alkyl glycerol ether sulphonates, acyl glutamates, acyl peptides, sarcosinates, ester carboxylic acids,  $\alpha$ -olefin sulphonates, sulphosuccinates, alkyl benzene sulphonates, amides of N-methyl taurine and  $\alpha$ -sulpho fatty acids;

A2 - at least 1% by weight of the composition of amphoteric detergent selected from betaines, sulphobetaines and amidobetaines; and

B - at least 0.1% by weight of the composition of a skin emollient material.

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ORIGINAL  
COMPLETE SPECIFICATION  
STANDARD PATENT

Invention Title:

DETERGENT COMPOSITION.

The following statement is a full description of this invention, including the best method of performing it known to me:-

DETERGENT COMPOSITION

This invention is concerned with liquid detergent compositions suitable for personal washing. Examples of such compositions are shower gels and bath foams. A requirement for such compositions is that they should generate a lather when used.

Emollient materials are typically used in a skin cream to help restore and maintain the water content of the skin. At least some emollient materials are inherently antifoaming in nature and therefore appear unsuitable for incorporation in a product which is required to generate a lather in use.

We have, however, now found that it is possible to incorporate such materials into a liquid product.

Broadly, therefore, this invention provides an aqueous liquid detergent composition containing foaming detergent active and skin emollient material.

A - Detergent Active Materials

The detergent active materials employed in the present invention are selected from the class consisting of anionic, amphoteric, and nonionic detergents. It is

preferred that the detergent active is a mixture of:

A1 - non-soap anionic detergent, and

A2 - amphoteric or polar nonionic detergent.

5 Preferred anionic detergents (A1) are alkyl ether  
sulphates, acyl isethionates, alkyl glycerol ether  
sulphonates, acyl glutamates, acyl peptides, sarcosinates,  
ester carboxylic acids,  $\alpha$ -olefin  
sulphonates, sulphosuccinates, alkyl benzene sulphonates,  
amides of N-methyl taurine,  $\alpha$ -sulpho fatty acids and alkyl  
10 sulphates. Such detergents generally include an alkyl or  
acyl group of 8 to 20 carbon atoms, together with an  
anionic group. In a preferred aspect of the invention, the  
anionic detergent includes at least 2% by weight of the  
composition of C<sub>8</sub>-C<sub>22</sub> acyl isethionate.

15 It is particularly preferred that the second  
detergent (A2) is an amphoteric surfactant which may be a  
betaine, a sulphobetaine or an amido betaine. All of these  
are zwitterionic. Less preferred are acyl ethanolamides,  
acyl diethanolamides and amine oxides, all of which are  
20 polar nonionic surfactants.

#### B - Skin Emollient Agents

These materials may be chosen from three  
categories which are

B1 - Skin moisturisers

B2 - Occlusive agents

B3 - Humectants

5 Skin moisturisers (B1) are compounds which enhance moisture retention by the skin and may also attract water into the skin. Typical moisturising materials include urea, lactic acid, pyrrolidone carboxylic acid, amino acids and salts of the acids mentioned.

10 The occlusive agents (B2) are substances which form on the skin thin films of limited permeability, serving to hold water within the skin and prevent dehydration. The range of occlusive agents is considerable. They are generally hydrophobic oils and waxes. Examples of classes of such agents and individual  
15 examples of such agents are:

1. Hydrocarbon oils and waxes. Examples thereof are mineral oil, petrolatum, paraffin, ceresin, ozokerite, microcrystalline wax.

2. Silicone oils, such as dimethyl  
20 polysiloxanes, methylphenyl polysiloxanes, silicone glycol copolymers.

3. Triglyceride esters, for example vegetable and animal fats and oils.

4. Glyceride esters and esters such as acetylated monoglycerides, and ethoxylated monoglycerides.

5. Alkyl and alkenyl esters of fatty acids having 10 to 20 carbon atoms. Examples include hexyl laurate, isohexyl laurate, isohexyl palmitate, isopropyl myristate, isopropyl palmitate, decyl oleate, isodecyl oleate, hexadecyl stearate, decyl stearate, isopropyl isostearate, diisopropyl adipate, diisohexyl adipate, dihexyldecyl adipate, diisopropyl sebacate, lauryl lactate, myristyl lactate, cetyl lactate, oleyl myristate, oleyl stearate and oleyl oleate.

6. Fatty alcohols having 10 to 20 carbon atoms. Lauryl, myristyl, cetyl, hexadecyl, stearyl, isostearyl, hydroxystearyl, oleyl, ricinoleyl, behenyl, erucyl, and 2-octyl dodecanyl alcohols are examples of satisfactory fatty alcohols.

7. Lanolin and derivatives. Lanolin, lanolin oil, lanolin wax, lanolin alcohols, lanolin fatty acids, isopropyl lanolate, ethoxylated lanolin, ethoxylated lanolin alcohols, ethoxylated cholesterol, propoxylated lanolin alcohols, acetylated lanolin, acetylated lanolin alcohols and lanolin alcohols linoleate are illustrative emullients derived from lanolin.

8. Natural waxes, esters thereof and eth xylated natural waxes, beeswax, spermaceti, myristyl myristate, stearyl stearate, polyoxyethylene sorbitol beeswax, carnauba wax and candelilla wax.

5 Especially preferred are  $C_2$ - $C_4$  alkyl esters of  $C_{12}$ - $C_{18}$  fatty acids, such as isopropyl myristate, and isopropyl palmitate.

10 Humectants (B3) are especially  $C_2$ - $C_6$  polyols notably glycerol, sorbitol, propylene glycol and 1,3-butylene glycol. A further example of humectant is polyethylene glycols having molecular weights of from about 100 to about 1500. Humectants do not themselves form occlusive films but may cooperate with other materials to form a film having occlusive properties. It is therefore  
15 desirable that humectants are not the sole category of skin emollient agent present.

The overall amount of emollient agents included in a composition of this invention is preferably in a range from 0.1 to 10% of the composition more preferably 0.2 to  
20 5% by weight of the composition. Somewhat more specifically, it is preferred that the skin emollient agents include occlusive agent (B2) in an amount from 0.1 to 2% by weight of the composition, better 0.2 to 1%. If skin moisturiser (B1) is present the amount is preferably  
25 0.02 to 5%, better 0.05 to 2% of the composition. If

humectant (B3) is present the amount will generally not exceed 15% by weight of the composition and it will generally be convenient for humectant to be present in a quantity from 0.1 to 15% better 0.5 to 5 or 8% by weight of the composition.

Particularly preferred weight ratios of the three categories of skin emollient agent are a weight ratio of

$$B1:B2:B3 = 0-15:2-10:5-50$$

Preferred amounts of the detergent active lie in a range from 3-40% by weight of the overall composition, preferably 5 to 25% by weight. Preferably anionic detergent active (A1) is present in an amount from 5 to 20% by weight of the composition while a second detergent active (A2) is present in an amount from 0.5 to 15%, preferably 1 to 10% by weight of the composition. The two categories of detergent active A1:A2 are preferably in a weight ratio from 10:1 to 1:10, better 9:1 to 1:2.

The weight ratio of detergent active to skin emollient agents preferably lies in a range from 20:1 to 5:1. Alternatively or additionally the weight ratio of detergent active to occlusive agent lies in a range from 10:1 to 100:1.

Thus, a preferred form of this invention comprises the materials A1, A2 and B1-B3 as explained above



in amounts by weight which are:

A1	:	5-20%
A2	:	0.5-15%
B1	:	0.02-5%
B2	:	0.1-2%
B3	:	0-15% preferably 0.5 to 8%

Other materials may be included in compositions according to this invention. In particular, electrolyte or thickening agents or both may be incorporated to control the viscosity of the composition. We prefer that compositions of this invention should have a viscosity in the range from 10,000 to 1000 mPs at 10 sec<sup>-1</sup> shear rate, more preferably 8000 to 2000 mPs.

Thickening agents may be synthetic cross-linked polymers such as cross-linked polyacrylates. Another category of thickening agents are polysaccharides such as vegetable mucins, alginates, cellulose derivatives and xanthan gums. The amount of any thickening agent is likely to range from 0.01 to 5% by weight of the composition and likely narrower limits are 0.05 to 2% by weight of the composition.

Further materials which are likely to be included are pearlescers or opacifiers, perfumes, colorants and antioxidants. Preservatives may well be included.

Free fatty acids typically of 8 to 22 carbon atoms may be present or may be avoided. Soaps are possible but are preferably avoided. If soap or fatty acid is present the amount of each is unlikely to exceed 5% by weight of the composition and more particularly may be in an amount from 0.5 to 2.5% by weight of the composition.

One feature which is possible within this invention is that the skin emollient agents (B) may be capable of incorporation at the same relative proportions into a stable emulsion. The concentration of these agents in such an emulsion would be the same or more probably greater than their concentration in the detergent composition of the invention.

This feature creates the possibility of incorporating the formulation of one product form, namely a skin moisturising liquid or cream, into another product form, namely the liquid detergent composition of the invention.

When the invention takes such a form it can be defined as an aqueous liquid detergent composition containing

foaming detergent active and  
the non-aqueous constituents of a moisturising emulsion which comprises skin emollient agents.

Such a moisturising emulsion might include other materials which are also incorporated into the detergent composition, for example thickeners, opacifiers or pearlescers.

5

Forms of the invention which are of special interest are those in which the detergent active comprises  $C_8$  to  $C_{12}$  fatty acyl isethionate. Fatty acyl isethionate is known as mild to the skin but is poorly soluble. We have observed that combinations of fatty acyl isethionate with an amphoteric surfactant or a polar nonionic surfactant can give solutions which are clear and isotropic (if in the absence of opacifier, pearlescer or other non-detergent insolubles).

10

Consequently forms of this invention can be

15

defined as detergent compositions containing

A) 3 to 40% of detergent composed of

A1) at least 2% of  $C_8$ - $C_{12}$  acyl isethionate

A2) at least 1% of amphoteric or polar nonionic detergent

B) 0.1 to 10% of skin emollient agents

20

wherein the ratio of acyl isethionate to detergent A2 is from 10:1 to 1:4, better 5:1 to 1:2, and the detergent actives present in the composition form a clear solution in distilled water at the same concentrations.

The detergent actives present may include

additional anionic detergent (A1) and the amount may be such as to keep the ratio of total anionic (A1) to second detergent (A2) within a range of 10:1 to 1:2.

#### Method of Preparation

5

The compositions of this invention can be prepared by simply mixing their constituents with water. Premixes of some components may be made and combined, if convenient. It will generally be desirable to arrange the order of addition so that thickening occurs after most of the mixing has taken place.

10

#### Example 1

Shower gels were prepared with formulations as set out in Table 1 below.

15

In each case the anionic detergent (A1) was sodium lauryl ether sulphate (SLES) with an average of three ethylene oxide groups per molecule. The second detergent (A2) was coconut amido propyl betaine (CAPB) opacifier was a polystyrene latex. The alternative to this was a pearlescent agent which was ethylene glycol distearate (EGDS).

20

"NMF" denotes a mixture of materials sold as equivalent to a natural moisturising factor in skin. Such

a mixture is available commercially as HYDROVITON (trade mark) from Dragoco, LACTIL (trade mark) from Goldsmith or PRODEW (trade mark) from Ajinomoto. The NMF used contained 40% of free amino acids, 12% pyrrolidone carboxylic acid, 7% urea and 12% lactate, the balance being made up by other constituents. Thus this material contained at least 70% of skin moisturising agents.

TABLE 1

<u>Formulation:</u>		A	B	C	D
Ingredients		% by weight			
SLES		12	12	12	12
CAPB		3	3	3	3
Opacifier		1	1	-	-
Pearlescer		-	-	4	4
Isopropyl palmitate		-	0.5	-	0.5
Glycerol		-	1.25	-	1.25
NMF		-	0.25	-	0.25
Preservative		0.07	0.07	0.07	0.07
Sodium chloride		4.0	4.0	4.0	4.0
Water		- - balance to 100% - -			

The four formulations were assessed by a panel of ten persons. Each panelist wore surgical gloves. The gloves were first washed with a standard detergent composition in running water at 30°C. One gram of the test composition was then dispensed from a syringe into the

palm of each panelist. The panelists were asked to wash their hands as they would normally, using water of 26° French hardness (FH) at 30°C. The panelists were asked to score the lather volume and perceived creaminess of the lather. The actual amount of lather produced was assessed by collecting the lather in an inverted funnel which is then used to transfer the lather to a graduated cylinder.

The ability of the compositions to generate foam was also determined by the following test. 5 grams of the formulation was put into a graduated separating funnel. 50 grams of water is then added. This water was of 26° FH at 25°C. The funnel is shaken for 10 seconds and the foam level measured and noted as "initial foam". The solution below the foam is drained off, a further 50 grams of water is added, the funnel is shaken again and foam volume noted. The draining off of solution, addition of water and shaking is repeated until all foam has disappeared. The number of additions of 50 gram aliquots of water is referred to as "number of rinses" and is an indication of the amount of water required to rinse the foam. Each time an aliquot of water was added and the separating funnel shaken the amount of foam present was noted. The total of these amounts of foam is referred to as the cumulative foam volume.

Tabl 2 sets out total of normalised panel scores, cumulative foam volume and number of rinses (i.e.

number of aliquots added until no foam remains) for each of the four formulations.

The results show that the inclusion of emollient agents in formulations B and D had little or no adverse effect on foaming. In the case of compositions A and B, the panel test and funnel test give opposite results but it can be seen that the effect of including the emollient agents is much less than the change from opacifier to pearlescer.

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TABLE 2

Formulation:				
	A	B	C	D
Total Normalised Panel Scores:				
Lather Volume	142.7	102.3	98.1	102.1
5 Lather Creaminess	111.7	105.4	103.9	99.2
<u>Funnel Test</u>				
Cumulative Foam Volume	6550	6900	2025	2550
No Rinses to Zero Foam	15	13	11	11



Example 2

Creams were prepared using emollient agents and pearlescer or opacifier as used in Example 1. Crosslinked polyacrylate was included. The formulations were as

5 follows:

<u>Formulation:</u>	<u>E</u>	<u>F</u>
Ingredient	wt%	wt%
Glycerol	5	5
Isopropyl palmitate	2	2
NMF	1	1
Pearlescer	16	-
Opacifier	-	4
Perfume	1	1
Polyacrylate	1	1
Water	-- balance to 100% --	

The method of producing the creams was to mix all of the materials with water, incorporating the polyacrylate in the acid form supplied by the manufacturers, and shaken to form an emulsion. The resulting compositions were

20 viscous stable creams.

Exempl 3

Liquid compositions were prepared generally as in Examl 1 but incorporating a sulphosuccinate in place of

betaine. One composition incorporated 25% of glycerol.

The formulations were:

5	<u>Formulation:</u>	G	H
	Ingredient	% by weight	
10	SLES	10	10
	Sulphosuccinate	2	2
	Tegobetaine	3	3
	Glycerol	-	25
	Perfume	1.5	1.5
	Sodium chloride	1.5	1.5

The compositions were assessed by panel testing as in Example 1 and the results obtained were as follows:

15		G	H
		(with glycerol)	
	Panel Scores:		
	Lather Volume	158	165
	Lather Creaminess	125	148

#### Example 4

20 Example 3 was repeated, but one formulation contained 10% of sodium lactate. The results were as follows:

Total Panel Scores	without lactate	with lactate
Lather Volume	227	188
Lather Creaminess	162	174

5        These Examples 3 and 4 show that up to 25% glycerol and up to 10% lactate can be included without serious adverse effect.

#### Example 5

10        A shower gel was prepared generally as Example 1D, but containing a different detergent active system, which includes sodium cocoyl isethionate.

15        The foaming ability of this composition was compared with two compositions similar to Examples 1C and 1D. The three formulations were as set out in Table 4 below. SLES, CAPB, NMF and pearlescer are the same materials as used in Example 1.

20        The test procedure was as follows. 2 gram of test composition are dissolved in 20mls of distilled water. 20mls of this solution are put into a 100ml stoppered measuring cylinder. The cylinder is shaken 10 times, swapp d to the oth r hand and shaken 10 times again. The height of the lather is measured immediately. The operation is perform d twice for each product, and the results are an av rag of the two measurements.

The data obtained by this method are included in Table 4 below.

TABLE 4

Formulation:I      J      K

## Ingredients

% by weight

Sodium cocoyl isethionate

5      -      -

SLES

2      13      13

CAPB

8      2      2

Pearlescer

4      4      4

Isopropyl palmitate

0.5      -      0.5

Glycerol

1.25      -      1.25

NMF

0.25      -      0.25

Preservative

0.07      0.07      0.07

Sodium chloride

3.5      4.0      4.0

Water

-- balance to 100% --

Foam height (cm)

14.7      12.5      15.4

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A detergent composition in the form of an aqueous liquid of viscosity in the range from 10,000 to 1,000 mPas at 10 sec<sup>-1</sup> shear rate, comprising:

5 A - foaming detergent active which is a mixture of:

A1 - at least 5% by weight of the composition of a non-soap anionic detergent which is selected from alkyl ether sulphates, acyl isethionates, alkyl glycerol ether sulphonates, acyl glutamates, acyl peptides, sarcosinates, ester carboxylic acids,  $\alpha$ -olefin sulphonates, sulphosuccinates, alkyl benzene sulphonates, amides of N-methyl taurine and  $\alpha$ -sulpho fatty acids; with the proviso that said anionic detergent includes at least 2% by weight of the composition of C<sub>8</sub>-C<sub>22</sub> acyl isethionate;

A2 - from 1 to 15% by weight of the composition of amphoteric detergent selected from betaines, sulphobetaines and amidobetaines; and

20 B - at least 0.1% by weight of the composition of a skin emollient material.

2. A detergent composition according to claim 1, wherein the skin emollient material (B) is selected from:

B1 - skin moisturisers

B2 - occlusive agents

25 B3 - humectants

and mixtures thereof.

3. A detergent composition according to claim 2, wherein the skin moisturiser, if present is selected from urea, lactic acid, pyrrolidone carboxylic acid, amino acids, and salts of these acids.



4. A detergent composition according to claim 2, wherein the occlusiv agent, if present, is selected from: hydrocarbon oils and waxes; silicon oils; triglyceride esters; glyceride esters, acetylated monoglycerides, alkoxylated monoglycerides, alkyl and alkenyl esters of fatty acids having 10 to 20 carbon atoms; fatty alcohols having 10 to 20 carbon atoms; lanolin and derivatives thereof; natural waxes, esters thereof and alkoxylated natural waxes.

10 5. A detergent composition according to claim 2, wherein the humectant, if present, is selected from  $C_2$ - $C_4$  polyols; polyethylene glycols having molecular weights of from 100 to 1500.

15 6. A detergent composition according to any preceding claim, wherein the skin emollient material (B) is present in an amount of from 0.1 to 10% by weight of the composition.

20 7. A detergent composition according to claim 2, wherein:  
the skin moisturiser (B1), if any, is present in an amount of from 0.02 to 5% by weight, of the composition; the occlusive agent (B2), if any, is present in an amount of from 0.1 to 2% by weight of the composition; and the  
25 humectant (B3), if any, is present in an amount of up to 15% by weight of the composition.

8. A detergent composition according to claim 7, wherein the weight ratios of the three categories of skin emollient material are  $B1:B2:B3 = 0-15:2-10:5-50$ .

9. A detergent composition according to any preceding claim, wherein the detergent active (A) is present in an amount not exceeding 40% by weight of the composition.

5 10. A detergent composition according to any one of the preceding claims wherein the non-soap anionic detergent (A1) is present in an amount of from 5 to 20% by weight of the composition, and the amphoteric detergent (A2) is  
10 present in an amount of from 1 to 15% by weight of the composition.

11. A detergent composition according to claim 10, wherein the weight ratio of the two categories of detergent active is A1:A2 = 10:1 to 1:10.

12. A detergent composition according to any  
15 preceding claim, wherein the weight ratio of foaming detergent active (A) to skin emollient material (B) is A:B = 20:1 to 5:1.

13. A detergent composition according to claim 2,  
20 wherein the weight ratio of foaming detergent active (A) to occlusive agent (B2) is A:B2 = 10:1 to 100:1.

14. A detergent composition according to any preceding claim, wherein the skin emollient material comprises a humectant (B3) together with a skin moisturiser (B1).

25 15. A detergent composition according to any preceding claim, wherein the skin emollient material comprises a humectant (B3) together with an occlusive agent (B2).

16. A detergent composition in the form of an aqueous liquid of viscosity in the range from 10,000 to 1,000 mPas at 10 s c<sup>-1</sup> shear rate, comprising:

A - foaming detergent active which is a mixture of:

- 5 A1 - at least 5% by weight of the composition of a non-soap anionic detergent which is selected from alkyl ether sulphates, acyl isethionates, alkyl glycerol ether sulphates, acyl glutamates, acyl peptides, sarcosinates, ester carboxylic acids,  $\alpha$ -olefin sulphates, 10 sulphosuccinates, alkyl benzene sulphates, amides of N-methyl taurine and  $\alpha$ -sulpho fatty acids; A2 - at least 1% by weight of the composition of amphoteric detergent selected from betaines, sulphobetaines and amidobetaines; and 15 B - a skin emollient material which is a mixture of: B1 - 0.02-5% of skin moisturiser, B2 - at least 0.1% of occlusive agent; and B3 0-15% of humectant.

17. A detergent composition according to any 20 preceding claim, further comprising one or more additional materials selected from thickening agents, pearlescers or opacifiers, perfumes, colourants, antioxidants, preservatives, fatty acids and soaps.

18. A detergent composition according to Claim 16, 25 wherein the anionic detergent active (A1) comprises C<sub>8</sub> to C<sub>22</sub> fatty acyl isethionate.

19. A detergent composition containing:

(A) 3 to 40% of detergent composed of

A1) at least 2% of C<sub>8</sub>-C<sub>22</sub> acyl isethionate

A2) at least 1% of amphoteric or polar nonionic detergent

30





5 (B) 0.1 to 10% of a skin emollient material,  
wherein the weight ratio of acyl isethionate (A1) to  
detergent (A2) is from 10:1 to 1:4 and the detergent  
actives present in the composition form a clear solution in  
distilled water at the same concentrations.

20. A detergent composition according to claim 19,  
wherein the detergent actives present include additional  
anionic detergent.

10 21. A detergent composition according to claim 20,  
wherein the amount of additional anionic detergent is such  
as to keep the weight ratio of total anionic detergent to  
second detergent (A2) within the range 10:1 to 1:2.

DATED THIS 27TH DAY OF MAY 1996

UNILEVER PLC

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Fellows Institute of Patent  
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ABSTRACT

DETERGENT COMPOSITION

A foaming detergent composition for personal washing comprises:

- A - a detergent active, preferably a mixture of
    - A1 - non-soap anionic detergent, and
    - A2 - amphoteric or polar nonionic detergent; and
  - B - a skin emollient material, preferably selected from
    - B1 - skin moisturizers
    - B2 - occlusive agents
    - B3 - humectants
- and mixtures thereof.